Comptes Rendus of the Academy of Science. The construction, the filling, the guiding, and general management of balloons, occupied so much of the attention of the Academy, that, if all other records of the Siege were lost, its date and effective duration might be pretty accurately determined by the sudden appearance, the continuance, and sudden cessation of these abundant papers on aërostation.

There is another series of papers of equal, if not greater significance, viz., those on the utilisation of strange materials for food, the economising of waste nutritive materials, and their substitutive uses.

The investigations on these subjects have led to more practical results than the papers on aërostation. This has been especially the case with the researches that are described in the papers of M. Boillott, M. Dubrunfant, and M. Charles Fua, on "Alimentary Fats."

"Alimentary fats" is a wide expression, including some rather unsavoury hydro-carbons and very curious refuse materials. The main object of these investigations was to determine how such substances may be "usefully employed in alimentation," or, in plain unsophisticated English, how to make butter from candle-ends, dirty dripping, colza oil, fish oils, the refuse of slaughter houses, the restored grease of the wool-dresser, &c. The general result has proved that the "frying process"—which was not altogether unknown to certain enterprising Englishmen before the investment of Paris—is triumphant over all its rivals; that by simply raising the fat to 140° or 150° Centigrade, and in the mean time cautiously sprinkling with water, the cellular tissue, the volatile oils, the rancidity, offensive odours, and all other non-sentimental impediments to "alimentation," are removeable.

This frying process has already effected something like a revolution in the industry of soap-boilers, some of whom have changed their trade to that of butter-fryers. We may thus explain the remarkable fact that, although the excessively dry summer of 1870 reduced the dairy produce of England to about half the average, and had nearly the same effect on our other sources of cow-butter supply, there was no material reduction in the supply or consumption of fresh butter for the London and Provincial markets during the following winter, the only notable disturbance which occurred being in the demand for kitchen-stuff and empty Dutch butter-tubs.

M. Dubrunfant is not content with superseding the cow in the mater of butter, but has subsequently made similar attempts upon milk. He proceeds in a strictly scientific manner, commencing with the following summary of the results of Boussingault's analysis of cow's milk:—

Nitrogenous material (caseine and albumen)	0·0337
Fatty material (butter)	0·0376
Sugar (of milk)	0·0567
Salts	0·0020
Water	0·8700

Quoting the observations of Payen and others which show that milk is alkaline, and owes its alkalinity to soda, he proceeds to refute the theory of churning which has been generally adopted by microscopists, viz., that the fat globules in milk are invested with a delicate membrane which is ruptured in the churn, and thereby permits the agglomeration of the fatty material into butter.

M. Dubrunfant contends that milk is simply an emulsion of neutral fatty matter in a slightly alkaline liquid, such as can be artificially imitated; and that the process of churning consists in hastening the lactic fermentation, thereby acidifying the serum of the milk, and at the same time agglomerating the fatty matter which the acidity sets free from its emulsion. He further controverts the cellular theory by showing that the fat globules of milk do not display any double refraction, as do all organised membranous tissues.

Having thus examined the theoretical constitution of milk, he proceeds to the practical method of imitating it, and gives the following directions: Add to half a litre of water forty or fifty grammes of saccharine material (cane sugar, glucose, or sugar of milk), twenty or thirty grammes of dry albumen (made from white of egg), and one or two grammes of subcarbonate of soda. These are to be agitated with fifty or sixty grammes of olive oil or other comestible fatty matter until they form an emulsion. This may be done either with warm or cold water, but the temperature of 50° to 60° C. is recommended. The result is a pasty liquid, which, by further admixture with its own bulk of water, assumes the consistency and general appearance of milk.

Luxuriously-minded people who prefer rich cream to ordinary milk can obtain it by doubling the quantity of fatty matter, and substituting two or three grammes of gelatine for the dry albumen. The researches of Dumas and Fremy having reinstated gelatine among the nitrogenous alimentary materials, M. Dubrunfant prefers gelatine to albumen; it is cheaper, more easily obtained, and the slight viscosity which it gives to the liquid materially assists the formation and maintenance of the emulsion. He especially recommends this in the manufacture of "siege-milk," on account of the obviously numerous articles from which gelatine may be obtained.

The uses of artificial milk need not be limited to supplying the wants of the residents of besieged cities. As an ordinary element of the human breakfast table, it is not likely to supersede the product of the cow, but calves are suggested as being superior to vulgar human prejudices. In the ordinary course of rearing, these animals demand a large proportion of the milk of their mothers, and are commonly ill-fed or prematurely sacrificed on that account. By feeding them luxuriously on artificial milk (which may be still further cheapened by using colza oil, which has been rendered tasteless and alimentary by the frying process above described), the milk, butter, and cheese of the cow may be considerably economised, and the supply of veal improved both in quantity and quality, by keeping the calves a much longer time before they are killed.

I might make further suggestions in the direction of "dairy-fed pork," &c., but this is unnecessary, the commercial instinct is sufficiently strong to avail itself of all such cheapening applications of science. Those who are professionally engaged in detecting the adulterations of food will do well to study the physical peculiarities by which M. Dubrunfant's milk may be distinguished from that of the cow, both in the ordinary and condensed form. By substituting vegetable albumen for the white of egg or gelatine, the vegetarian may prepare for himself a milk that will satisfy his uttermost aspirations.

W. MATTIEU WILLIAMS

NOTES

THE following telegrams have been received from the Eclipse Expedition since our last:—"MANGLORE, Wednesday, Dec. 6.—We have landed here from the flagship; all well. The Government arrangements are admirable. The weather is promising. The parties are posted as arranged." From N. R. Pogson, at Avenashy, to the Astronomer Royal, Royal Observatory, Greenwich:—"Weather fine; telescopic and camera photographs successful; ditto polarisation; good sketches; many bright lines in spectrum.—Dec. 12." From Colonel Tennant, F.R.S., Dodabeta, Ootacamund, to W. Huggins, F.R.S., Dec. 12, 9.15 A.M.:—"Thin mist. Spectroscope satisfactory. Reversion of lines entirely confirmed. Six good photographs."

AT the meeting of the Geological Society on the 6th inst., the President announced the bequest to the Society, on the part of the late Sir R. I. Murchison, of the sum of 1,000*l.*, to be invested in the name of the Society or its trustees, under the title of the "Murchison Geological Fund," and its proceeds to be annually devoted by the Council to the encouragement or assistance of geological investigation. The donation of the proceeds of the fund was directed by the testator to be accompanied by a bronze copy of the Murchison Medal.

At the meeting of the Royal Geographical Society on Monday last, Sir Henry Rawlinson stated that the Council intended to address the Foreign Office, with a view of arranging, either directly from the Foreign Office, or through co-operation between the Foreign Office and the Society, some means of communicating with Dr. Livingstone, either by sending messengers into the interior of Africa, and offering a reward of 100 guineas to any African who will bring back a letter in Dr. Livingstone's handwriting to the sea-coast, or by organising a direct expedition, headed by some experienced and well-qualified European, who should himself penetrate to the point where Dr. Livingstone is supposed to be.

By a decree, dated April 18, 1866, of the Minister of Public Instruction in France, a prize of 50,000fr. (2,000*l.*) was offered for the most useful application of the Voltaic Pile, the period for competition to expire in April 1871. From a report of the minutes presented by the President of the Republic, it appears that candidates are few in number, and that in the opinion of the *savants* to whom the memoirs were submitted, none is of sufficient merit to have earned the prize. By a decree of the 29th of November, the competition is now extended for another period of five years, to terminate on November 29, 1876.

We learn from the *Lancet* that the promoters of the scheme for commemorating the life and labours of John Goodsir, late Professor of Anatomy in the University of Edinburgh, have got only 700*l.* instead of 2,000*l.*, and have had to relinquish the idea of a fellowship, and adopt that of a triennial prize, to be open to all graduates of the University of not more than three years' standing, to be given for an essay or treatise containing the results of original investigations in anatomy, human and comparative, either normal or pathological, or in experimental physiology. The Acting Committee of the Association for the better Endowment of the University of Edinburgh have prepared the deed of endowment for the Syme Memorial. The capital sum amounts to 2,500*l.*; whereof 2,000*l.* were paid over to the Association by the Syme Memorial Committee, and 500*l.* was added by the Association.

The authorities of the Museum of Comparative Zoology at Harvard College have placed in Prof. Allman's hands for determination the whole of the collection of hydroid zoophytes obtained by the United States Coast Survey during its late exploration of the Gulf Stream.

The Council of the University of Edinburgh has decided to take into consideration on the 21st inst. the appeal against the decision of the Senate as to rescinding the regulations for the education of women in medicine.

The Examiners in the Natural Science School at Oxford (W. Ogle, M.D., Corpus; J. A. Dale, Balliol; and R. H. M. Bosanquet, St. John's) on Saturday issued the subjoined class list:—Class I.—H. A. Black, Christ Church; W. T. Goolden, Magdalen; E. H. Jacob, Corpus; A. S. L. Macdonald, Merton; J. A. Ormerod, Jesus; A. G. Rücker, Brasenose; S. H. West, Christ Church. Class II.—E. H. Forty, Christ Church; J. Turner, Exeter; J. L. Twynam, St. Mary Hall. Class III.—*Nil.* Class IV.—*Nil.*

Mr. W. A. Brailey, who was second in the Natural Sciences Tripos at Cambridge, has been elected a Fellow of Downing College in that University.

M. Georges Delaporte, engineer of M. Tessié de Motay's Oxy-hydrogen Light Company, has been nominated a Chevalie of the Legion of Honour, as an acknowledgment of the services rendered to the State during the Siege of Paris in the application of the Electric Light to strategic operations.

The Lord President of the Council has nominated Mr. T. S. Aldis, formerly scholar of Trinity College, Cambridge (Second Wrangler in 1866), to be an Inspector of Schools.

The following are now announced as the probable arrangements for the Friday evening meetings at the Royal Institution before Easter 1872:—January 19, Mr. William R. Grove, F.R.S., on Continuity; January 26, the Archbishop of Westminster, on the Demon of Socrates; February 2, Prof. Odling, F.R.S., on the new metal Indium; February 9, Prof. Humphry, F.R.S., on Sleep; February 16, Dr. Gladstone, F.R.S., on the Crystallisation of Silver and other Metals; February 23, Mr. Henry Leslie, on the Social Influence of Music; March 1, Mr. C. W. Siemens, F.R.S., on Measuring Temperatures by Electricity; March 8, Mr. R. Liebreich, on the Effect of certain Faults of Vision on Painting, with especial reference to Turner and Mulready; March 15, Mr. John Evans, F.R.S., on the Alphabet and its Origin; March 22, Prof. Tyndall, F.R.S.

We learn from *Les Mondes* that the lamentable disagreement between M. Daubrée, the director of the mineralogical department of the Museum of Natural History at Paris, and his assistant, M. Stanislas Meunier, is now happily terminated, and that the latter is again permitted to carry on his researches at the Museum.

The Exhibition of the Photographic Society, held in its rooms in Conduit Street, closed on Saturday last. While among specimens of portraits the works of Grasshofer of Berlin, Rylander of Paris, and other Continental artists, challenged comparison with any of our home productions, there can be no question that in landscape photography, the exquisite workmanship of Bedford, Robinson, Cherrill, and some other English photographers, easily bore off the palm. There were some very fine specimens of Edwards's heliotype process, as well as of the autotype and other carbon-printing processes.

We learn from the *American Naturalist* that the State Microscopical Society of Illinois has issued a prospectus of *The Lens*, a Quarterly Journal of Microscopy and the Allied Natural Sciences; with the Transactions of the State Microscopical Society of Illinois. It will be an octavo, each number containing at least forty-eight pages of reading matter. Terms, 2 dols. per annum in advance. The editor will be Mr. S. A. Briggs, 177, Calumet Avenue, Chicago. Though its appearance has been delayed by the fire, we learn that it will soon be issued.

At a recent meeting of the Asiatic Society of Bengal Mr. W. T. Blanford exhibited a collection of chipped quartzite implements found about forty miles west of Bhadráchalam, on the Godávarí. The thirty-five specimens exhibited were all found within a space of about fifty yards square, and at least as many more were rejected on account of being badly made. The place where they were found was in dense jungle, the rock soft sandstone, and the implements, as was usually the case in Southern India, had evidently been chipped from pebbles. Several were formed of white vein quartz, an unusual circumstance. The forms of these implements were those of the kind most frequently found in French and English gravels, and they varied from about 3in. to 6in. in length. That the spot where they were found was a place of manufacture was probable, not only from the occurrence of ill-formed implements, but also from flakes, evidently chipped from the quartzite being abundant.

A very beautiful and extraordinary Aurora Borealis was witnessed at Montreal on November 21. The following account of the phenomenon has been sent us by Dr. Smallwood of the Montreal Observatory :—A few minutes past 5 o'clock yesterday evening, the eastern horizon showed a bank of cumulo-stratus clouds, which reached to an altitude of 9°, behind which was discernible an auroral light, which increased in intensity as the darkness became more dense. At 5.30 a diffused light of a bright crimson colour occupied the whole of the eastern and north-eastern horizons. Rising behind this bank of clouds, streamers were frequently observed, reaching to the constellation Cassiopeia. The light was frequently so dense as to prevent even the stars δ and γ Ursæ Majoris being seen through it. While these appearances were present, a far more brilliant display was seen in the north-west, triangular in shape, its base hidden by the Mountain, but which appeared about 10° in breadth, and extended upwards, passing part of the constellations Hercules, Corona Borealis, and Draco, to the zenith. The bright crimson colour was very intense ; its edges were occasionally softened by a band of narrow streamers of a palish green colour. Stars below the third magnitude were hidden from view, owing to the great density of this light. Small patches of cumulus clouds were seen passing across and in front of this display. The surpassing beauty of these appearances has rarely been equalled. At 6.15 P.M. the intensity of the brightness was much diminished, and at 7 only a soft auroral light was visible in the north and north-east. The declination magnet was very sensibly deflected from its normal state, showing a great easterly variation. The weather during the day was comparatively warm (having succeeded a slight fall of snow), with a rising barometer, which at 6 P.M. stood at 29·902 inches. Thermometer, 37°. Humidity, ·806. Wind west ; velocity three miles per hour.

PROF. PANCERI, of Naples, has been studying for some time past the phosphorescence of marine animals. He has examined *Noctiluca*, *Beroe*, *Pyrosoma*, *Pholas*, *Chætopterus*, and has lately published a paper on the phosphorescence of *Pennatula*. He finds in all cases that the phosphorescence is due to matter cast off by the animal—it is a property of dead separated matter, not of the living tissues. In all cases (excepting *Noctiluca*) he also finds that this matter is secreted by *glands*, possibly special for this purpose, but more probably the phosphorescence is a secondary property of the secretion. Further, the secretion contains epithelial cells in a state of fatty degeneration, and it is these fatty cells and the fat which they give rise to which are phosphorescent. Hence the phosphorescence of marine animals is brought under the same category as the phosphorescence of decaying fish and bones. It is due to the formation in decomposition of a phosphoric hydro-carbon, or possibly of phosphuretted hydrogen itself. In *Pennatula* Prof. Panceri has made phosphorescence the means of studying a more important physiological question—namely, the rate of transmission of an irritation. For when one extremity of a *Pennatula* is irritated, a stream of phosphorescent light runs along the whole length of the polyp-colony, indicating thus by its passage the rate of the transmission of the irritation. This admits of accurate measurement, and furnishes data for extending Helmholtz's and Donder's inquiries to animals so widely separated from their "Versuchs-thiere" as the *Cœlenterata*. It is also a proof of the thoroughness of Prof. Panceri's investigation that he has made use of the spectroscope for studying the light of phosphorescence.

ATTENTION has been called in *Harper's Weekly* to the injuries to the Florida submarine cable supposed to have been caused either by the bites of the sea-turtles, or from some kinds of fish ; and we now learn that in China a similar difficulty has been experienced in consequence of the attacks of a minute crustacean. This is so small as scarcely to be perceptible to the naked eye, but can be readily defined under the microscope. Various breaks have been satisfactorily referred to the agency of these animals, which had embedded themselves in the gutta percha. It has become necessary, therefore, to envelop the cables in certain localities with an external supplementary layer of metallic wire, in order to prevent injury in this manner.

WITH a commendable promptness, the first volume of the Annual Report of the United States Commissioner of Patents for 1870 has made its appearance, and inaugurates the new order in regard to this document. Instead of publishing the specifications of the patents with wood-cut illustrations, the present volume embodies—first, an alphabetical list of patentees during the year ; second an alphabetical list of the patents extended during the year ; next, an alphabetical list of inventions and of reissues. It will be remembered that at the present time the patents are printed in detail, accompanied by photo-lithographic drawings of working size, 150 copies being published, some of them to be distributed, and sets placed for free public inspection in the various State and Territorial capitals, and in the clerks' offices of the District Court of the various judicial districts throughout the United States. The issue of additional copies is also authorised in proportion to the demand, to be sold at a price not exceeding the contract price for such drawings. The total number of patents issued during the year 1870 amounted to 13,321, of which considerably the largest number were made out to citizens of New York, Pennsylvania, Massachusetts, Ohio, Illinois, Connecticut, Indiana, and Michigan, in the order mentioned.

THE *Mechanics' Magazine* states that amber is reported by the collectors as being sometimes found in a soft "unripe" state ; Herr H. Spirgatis was fortunate enough to receive a specimen from the Baltic, near Brusterort, East Prussia. Its interior consisted of an almost transparent yellow resin, surrounded by a thin opaque crust. When freshly broken the centre was soft and elastic, but on exposure to the air it soon became hard and brittle. Its analysis differed so much from that of amber, that though it evidently belongs to the same class of substances, it is not to be mistaken for it. Its percentage composition agrees with that of Benntheim asphalte, and with the fossil resins from the East Indies, examined by Duflos and Johnston.

ON Nov. 7 at 2.30 P.M. a slight earthquake was felt at Smyrna. It was simultaneous at Mytilene and Cheshmeh.

TWO smart shocks of earthquake were felt at Cavalla in Macedonia at 11 P.M. on Nov. 28.

ON Oct. 13 an earthquake was felt in the fort of La Libertad, at 11 P.M. It was also felt at La Union and Nicaragua.

ABOUT a year ago many English and foreign scientific journals, following the *Bulletino Romano*, announced that a large meteorite had fallen near the town of Murzuk, in December 1869. M. Rose has lately made a communication to the Berlin Academy, in which he states that the results of his inquiries made both at Tripoli and Murzuk have shown that no such fall was ever observed, much less that any such meteorite had been found.

IT is stated in *Land and Water* that the whole of the pack of fox-hounds of the Durham County Hunt has been condemned to be destroyed in consequence of the prevalence among it of a form of hydrophobia defined as "dumb madness," which has run through the kennels, and has carried off twelve couple of hounds. As to the details of this "dumb madness," it will be interesting to hear more of the exact symptoms attending it. Old works upon canine diseases used to specify seven species of canine madness, "dumb madness" among them, the last and worst being "running madness," which was undoubtedly hydrophobia, though probably many other phases of so-called madness were simply distemper, which in primitive days was little understood as a specific disease.